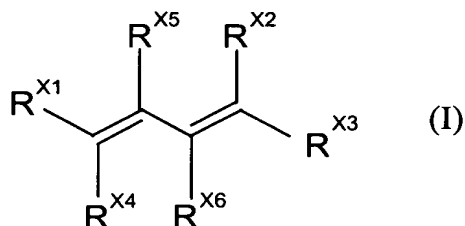


Claims:

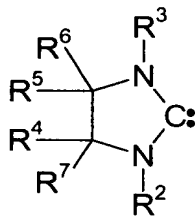
1. A process for the catalytic telomerization of acyclic olefins having at least two conjugated double bonds (I)

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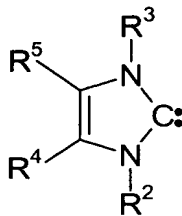


with at least one nucleophile,

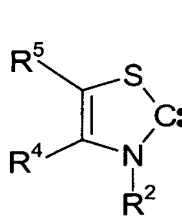
- 10 wherein complexes comprising metals of groups 8 to 10 of the Periodic Table of the Elements and at least one carbene ligand having one of the formulae



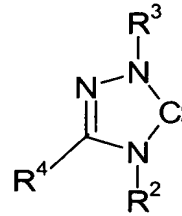
(III)



(IV)



(V)



(VI)

where

- 15 $R^{X1}, R^{X2}, R^{X3}, R^{X4}, R^{X5}, R^{X6}$ are identical or different and are each H or a linear, branched, substituted or unsubstituted cyclic or alicyclic aliphatic or aromatic group having from 1 to 24 carbon atoms,

R^2, R^3 : are identical or different and are each a) a linear, branched, substituted or unsubstituted cyclic or alicyclic alkyl group having from 1 to 24 carbon atoms,
or b) a substituted or unsubstituted, monocyclic or polycyclic aryl group having from 6 to 24 carbon atoms

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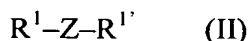
or c) a monocyclic or polycyclic, substituted or unsubstituted heterocycle having from 4 to 24 carbon atoms and at least one heteroatom from the group consisting of N, O, S,

5 R^4, R^5, R^6, R^7 : are identical or different and are each
hydrogen, alkyl, aryl, heteroaryl, -CN, -COOH, -COO-alkyl, -COO-aryl,
-OCO-alkyl, -OCO-aryl, -OCOO-alkyl, -OCOO-aryl, -CHO, -CO-alkyl,
-CO-aryl, -O-alkyl, -O-aryl, -NH₂, -NH(alkyl), -N(alkyl)₂, -NH(aryl),
-N(aryl)₂, -F, -Cl, -Br, -I, -OH, -CF₃, -NO₂, -ferrocenyl, -SO₃H, -PO₃H₂,
10 where the alkyl groups have 1-24 carbon atoms and the aryl groups have
from 5 to 24 carbon atoms and the radicals R^4 and R^5 may also be part of
a bridging aliphatic or aromatic ring,
with the proviso that when the metal of groups 8 to 10 of the Periodic Table is Pd, R^2
and/or R^3 have the meaning c), are used as catalyst.

15

2. The process as claimed in claim 1, wherein R^2, R^3, R^4, R^5, R^6 and R^7 are identical or
different and have at least one substituent from the group consisting of -H, -CN,
-COOH, -COO-alkyl, -COO-aryl, -OCO-alkyl, -OCO-aryl, -OCOO-alkyl, -OCOO-aryl,
-CHO, -CO-alkyl, -CO-aryl, -aryl, -alkyl, -alkenyl, -allyl, -O-alkyl, -O-aryl, -NH₂,
20 -NH(alkyl), -N(alkyl)₂, -NH(aryl), -N(aryl)₂, -F, -Cl, -Br, -I, -OH, -CF₃, -NO₂,
-ferrocenyl, -SO₃H, -PO₃H₂, where the alkyl groups have from 1 to 24, the alkenyl
groups have from 2 to 24 carbon atoms, the allyl groups have from 3 to 24 carbon atoms
and the aryl groups have from 5 to 24 carbon atoms.

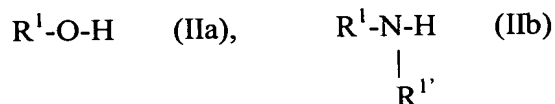
25 3. The process as claimed in claim 1 or 2, wherein a nucleophile of the formula (II)



where Z is O, N($R^{I''}$), S(O₂), Si($R^{I''}$)(OH), C=O, C(H₂), C(H)(NO₂) or
30 N(CH₂CH=CH₂) and $R^I, R^{I'}$ or $R^{I''}$ are identical or different and are each H, a
substituted or unsubstituted, linear, branched or cyclic alkyl or alkenyl group having
from 1 to 22 carbon atoms, a carboxyl group or an aryl group, where the radicals $R^I, R^{I'}$

may be joined to one another via covalent bonds and R^1 and $R^{1'}$ may bear identical or different substituents.

4. The process as claimed in at least one of claims 1 to 3, wherein compounds of the formula (IIa) or (IIb)



where R^1 , $R^{1'}$ are identical or different and are each H, a substituted or unsubstituted, linear, branched or cyclic alkyl or alkenyl group having from 1 to 22 carbon atoms, a carboxyl group or an aryl group and the radicals R^1 , $R^{1'}$ may be joined to one another via covalent bonds, are used as nucleophile.

5. The process as claimed in any of claims 1 to 4, wherein water, alcohols, phenols, polyols, carboxylic acids, ammonia and/or primary or secondary amines are used as nucleophiles.

6. The process as claimed in any of claims 1 to 5, wherein 1,3-butadiene or isoprene is used as acyclic olefin (I).

7. The process as claimed in any of claims 1 to 6, wherein 1,3-butadiene in admixture with other C_3 -, C_4 - and/or C_5 -hydrocarbons is used as acyclic olefin (I).

8. The process as claimed in any of claims 1 to 7 carried out in a solvent, where the nucleophile (II) and/or inert organic solvents is/are used as solvent.

9. The process as claimed in any of claims 1 to 8, wherein the ratio of carbene ligand to metal [mol/mol] is from 0.01:1 to 250:1.